



Six Sigma: insights from organizational innovativeness and market orientation

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Abstract

Purpose – Despite the implicit link of Six Sigma's focus on continuous innovation and customer satisfaction to concepts of organizational innovativeness and market orientation, there are limited theoretical analysis and conceptual development to guide and inform the theory of Six Sigma. This conceptual paper seeks to examine theoretical contributions of market orientation and organizational innovativeness to Six Sigma.

Design/methodology/approach – This paper examines how organizational innovativeness and market orientation reinforce Six Sigma by analyzing their relevance in terms of internal consistency and theoretical predications.

Findings – While market orientation enhances customer focus and promotes responsiveness through continuous innovation, Six Sigma's customer orientation can lead to over-emphasis on incremental innovation compromising capabilities for ground-breaking innovations. Six Sigma can redress this imbalance by integrating long-term goals and resource capability development.

Originality/value – This paper advances seven theoretical propositions highlighting key concepts of organizational innovativeness and market orientation as contributions to Six Sigma and avenues for further research.

Keywords Quality improvement, Brands, Customer orientation, Innovation, Six Sigma

Paper type Conceptual paper

1. Introduction

In today's competitive business environments, firms are under intense pressure to systematically produce tangible quality achievements, control quality standards and generate positive bottom line results. Six Sigma has been adopted by many organizations to develop and strive for excellence in quality standards and innovations. Six Sigma is a total quality system developed by Motorola Inc. to identify tools, methods and best practices for generating innovation and driving revenue growth (Creveling *et al.*, 2006). It is gaining recognition not only in a product and manufacturing environment but also in service industries and non-profit organizations. While the focus on innovation and customer is at the root of Six Sigma, this implicit link to concepts of organizational innovativeness and market orientation has received limited research attention. Theoretical analysis and conceptual development of Six Sigma have been relatively sparse due to practitioner oriented and prescriptive nature of Six Sigma as a consulting oriented framework. There is also lack of theoretical concepts to explain the differences between successful and unsuccessful efforts (Dean and Bowen, 1994; Antony *et al.*, 2007). In total quality management, there is ongoing debate as regards the usefulness of total quality initiatives such as Six Sigma. Thus, this paper aims to redress this imbalance by



examining two main theoretical concepts of organizational innovativeness and market orientation in relation to Six Sigma.

Six Sigma provides methods to generate systematic innovation in a structured way linked to market opportunities. Organizational innovativeness has been shown to have a positive impact on customer value and business performance (e.g. Han *et al.*, 1998; Hult *et al.*, 2004). Empirical evidence also suggests that an organization's innovativeness positively affects market orientation in generating superior value to customers (Atuahene-Gima, 1996). While Six Sigma encompasses other management principles and concepts such as leadership theory and control theory, this paper focuses on fundamental concepts of organizational innovativeness and market orientation underlying Six Sigma theory. The focus on innovation and customer is a fundamental aspect of Six Sigma methodology (Evans and Lindsay, 2005). While this paper discusses concepts related to organizational innovativeness and market orientation, future research on Six Sigma theory could examine other relevant management principles. Because Six Sigma methods and practices are often communicated to markets through branding activities (e.g. service performance, quality attributes) brand performance can serve as an indicator of customer value and loyalty related to business and quality performance. Six Sigma's quality control measures can be linked to brand attributes that impact on customer confidence and customer satisfaction. As such, the impact of Six Sigma practices through a sustained pursuit of continuous improvement can be conceptualized in terms of brand performance and perceived customer value. This paper advances Six Sigma theory by examining theoretical insights from organizational innovativeness and market orientation.

2. Six Sigma and theory development

Six Sigma is a total quality improvement philosophy based on an integrated total quality approach focusing on service innovation and continuous improvement (Park, 2003; Abramowich, 2005). A major difference between Six Sigma and other quality approaches is that Six Sigma aims to achieve 3.4 defective parts per million (Smith *et al.*, 2002). A defect is anything that caused customer dissatisfaction and sigma in statistics is a measure of variability or standard deviation. Six Sigma shifts the emphasis from fixing defective products to making perfect products and focuses on reducing the number of opportunities that could result in defects (Antony and Banuelas, 2001). As a management philosophy, Six Sigma permeates an organization's culture through comprehensive processes, methods and practices toward continuous improvement and customer satisfaction (Douglas and Erwin, 2000; de Koning and de Mast, 2006). Figure 1 provides an overview of the proposed conceptual model.

2.1 Organizational innovativeness

Six Sigma practices share three common quality principles: customer-focus, continuous improvement and teamwork but emphasizes innovation (Creveling *et al.*, 2006). These principles are supported by a set of practices that support activities such as collecting customer information, analyzing processes, and learning for continuous improvement and innovation. As such, an organizational innovativeness can be used as a basis for examining concepts related to Six Sigma. Organizational innovativeness

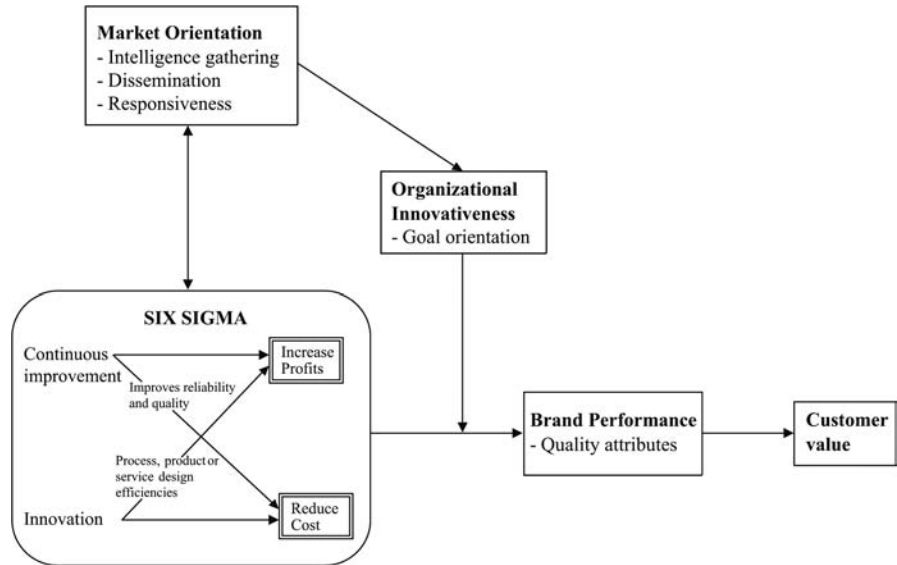


Figure 1.
An overview of the
conceptual model

refers to the organization's openness to new ideas as well as its capacity to innovate, implement and adopt a new idea, process or product successfully (Hurley and Hult, 1998). Jaworski and Kohli (1993) suggest that market orientation is a preamble for innovation since response to the market involves doing something new or different. The focus of market orientation on responding to customer needs through market driven innovation is compatible with organizational innovativeness (Slater and Narver, 1994). However, Six Sigma's customer orientation can lead to an excessive emphasis on incremental innovation derived from the desire to continuously adapt to the evolution of customer needs (Santos-Vijande and González-Alvarez, 2007).

In order to increase innovation beyond incremental types, organizational innovativeness of Six Sigma can gain insights from exploratory learning and goal orientation. While organizational learning has been shown to positively influence organizational innovativeness, exploratory learning that relates to more radical innovations can be suppressed with the emphasis of Six Sigma on continuous improvement. Exploitation learning that generates continuous improvement is incompatible with exploratory learning (March, 1991). Continuous improvement through exploitation competes for scarce organizational resources with exploratory learning for the development of groundbreaking innovations beyond the modification of processes in exploitation learning. Furthermore, both types of learning are iteratively self-reinforcing and organizational routines of continuous improvement are path dependent. While exploitation may generate early success, this reinforces further exploitation leading to a success trap (March, 1996). In contrast, exploration generates a broad dispersion in the range of possible outcomes, which often leads to failure and in turn reinforces the search for newer ideas, thereby creating a failure trap (March, 1991, 1996, 2006). Thus, it is proposed that:

- P1. Organizational innovativeness with its emphasis on change and new ideas positively mediates between Six Sigma and brand performance.

Goal orientation motivates learning and channels the organization efforts to continuous improvement and innovation in order to support Six Sigma's ultimate goal of 3.4 defects per million opportunities (Creveling *et al.*, 2006). Goal orientation can be described as the actions undertaken in the adoption and pursuit of specific goals in achievements contexts (Barron and Harackiewicz, 2001; DeShon and Gillespie, 2005). Goal orientation is a motivational construct that may explain why some individuals adapt to change better and predict learning in a wide variety of contexts (e.g. Phillips and Gully, 1997). Six Sigma is highly goal oriented with its focus on data driven methodologies to improve quality performance and continuously innovate (Pandé *et al.*, 2000; Gutiérrez *et al.*, 2009). While goal orientation of Six Sigma provides a common framework for driving process improvement, innovations and long-term organizational transformation, the focus on tangible and immediate results may have long-term deficiencies and/or overlook long-term opportunities. For example, there are no systematic empirical and longitudinal studies on long-term implications of Six Sigma's goal orientation. In addition, Six Sigma focuses on financial performance metrics, such as Six Sigma scorecard (McCarty *et al.*, 2004) and simple goal performance indicators (e.g. sales, market share, profitability), which may compromise long-term objectives or overlook complex processes (e.g. relationship development, current losses for long-term growth). Thus, it can be proposed that:

- P2. Six Sigma's goal orientation that integrates capability development for long-term organizational transformation is positively associated with higher levels of innovation.

2.2 Market orientation

Numerous studies have reported a positive relationship between market orientation and firm performance (e.g. Deshpandé *et al.*, 1993; Jaworski and Kohli, 1993; Narver and Slater, 1990; Slater and Narver, 1994). Market orientation can be described as the process of intelligence generation, dissemination of intelligence and responsiveness (Kohli and Jaworski, 1990), which is supported by three behavioral components: customer orientation, competitor orientation and inter-functional coordination (Narver and Slater, 1990). Customer and competitor orientations allow the generation of market information, whereas inter-functional coordination assists the dissemination of this information and provides appropriate response (Siguaw and Diamantopoulos, 1995). While market orientation prioritizes competitiveness and market superiority, organizational innovativeness advocates competitive advantage in openness to new ideas, and cultivates internally based capabilities to adopt new ideas, processes, or products successfully (Hurley and Hult, 1998). In brief, both market orientation and organizational innovativeness support Six Sigma.

Market orientation is compatible with Six Sigma's system-wide practice of quality management to deliver superior business performance and customer satisfaction. In terms of customer orientation, Six Sigma's decisions start with the customer through a deep understanding and strategic measurement of customer requirements, competitors' capabilities and market trends (McAdam *et al.*, 2009). Customer

orientation is visible and integral in Six Sigma tools of “voice of the customer” (VOC) and “voice of the marketplace” (VOM), which gather data from customers, competitors and market trends (Belohalav, 1993). Six Sigma also applies powerful tools to analyze customers such as in mapping customer processes, examining cause-and-effect relationships critical for delivering superior quality, and creating value for the customer’s business (Abramowich, 2005). Thus, Six Sigma embraces customer orientation through its philosophy of putting the customer’s interest first in overall business planning.

- P3.* Customer orientation is positively associated with Six Sigma’s methods to enhance customer satisfaction and business performance.

Competitor orientation can be defined as the ability and the will to identify and analyze the strengths and weaknesses of the competitors (Narver and Slater, 1990; Deshpandé *et al.*, 1993). Kohli and Jaworski (1990) suggest that market intelligence involves monitoring of competitor’s actions to establish their effect on customers. In Six Sigma organizations, different strategic analysis tools have been applied to analyze competitors or more precisely to develop response strategies to gain competitive advantage. The application of different strategic analysis tools can be traced to industry-structure analysis or market structure analysis (Porter, 1980, 1985), and resource-based analysis including market-based assets and knowledge-based view (Wernerfelt, 1984; Barney, 1991). Six Sigma’s performance metrics have mainly focused on customer and financial performance rather than internal capability development in response to competition. For example, some studies have examined market orientation as a capability using the resource-based view (e.g. Hunt and Morgan, 1995; Zhou *et al.*, 2005). Six Sigma can benefit from the resource-based view of internal capability development to complement measurable metrics based on industry or structural advantages, e.g. cost savings from efficiency gains. In addition, the resource-based view would enhance competitor orientation of Six Sigma with its emphasis on sustainability of competitive advantage by identifying unique, inimitable, rare and non-tradable firm-specific resources (Dierickx and Cool, 1989; Peteraf, 1993). Formally:

- P4.* Competitor orientation of Six Sigma combined with the resource-based view will have a positive effect on firm performance.

Inter-functional coordination can be defined as the coordinated utilization of company resources in creating superior value for target customers (Narver and Slater, 1990, p. 22). Empirical findings support the positive impact of interfunctional coordination on new product success (e.g. Griffin and Hauser, 1993), organizational learning (e.g. Huber, 1990; Hurley and Hult, 1998), knowledge management (e.g. Maltz and Kohli, 1996) and overall firm performance (e.g. Souder, 1987; Song *et al.*, 2000; Gray and Meister, 2004). Interfunctional coordination captures the tendency of different functional areas to accommodate disparate views and work around conflicting perspectives and mental models by putting aside functional interests for the benefit of the whole organization (Auh and Menguc, 2005). Six Sigma requires a total sense of involvement from every department, and an active participation of every member of the company team (Henderson and Evans, 2000; Gutiérrez *et al.*, 2009). Six Sigma

organizations need the capability of sharing information about customers and competitors, and the strategic integration of all functions in the process of creating customer value. However, coordination of functions may include structural mechanisms and behavioral norms to support intra- and inter-firm collaboration with cross-functional projects (Schroeder *et al.*, 2008; Eng, 2006). As such, Six Sigma's inter-functional coordination is not only supported by control mechanisms and structures but also by relational norms such as commitment and trust (Dyer and Singh, 1998; Morgan and Hunt, 1994). Thus, a Six Sigma quality leader's relationships (e.g. Master Black Belts) with other members in an organization and with other firms would facilitate and/or enhance business performance and responsiveness.

- P5. Inter-functional coordination of Six Sigma that spans intra- and inter-firm collaboration through relational norms is positively associated with firm performance.

2.3 Brand performance and customer value

The strategic outcomes of Six Sigma are often examined using quality management principles or operations management in terms of productivity and manufacturing outputs. As shown in Figure 1, the outcomes of capability processes of organizational innovativeness and market orientation in Six Sigma can be assessed in terms brand performance and customer value. This means that quality achievements of Six Sigma can be linked to brand performance. For example, quality control measures can be adopted to achieve continuous improvement of brand attributes and brand equity. Brand attributes can be related to distinctive features or accolades (e.g. an independent award for high quality service) supported by Six Sigma practices and methods. The brand performance generates brand equity and customer value from the quality control measures of Six Sigma. As Aaker (1991) points out, firms create brand equity by delivering quality products and by creating strong brand associations through appropriate communication and advertising strategies. Apart from using a corporate brand to differentiate and emphasize quality attributes, an organization can develop different sub-brands or use multiple brands. Thus:

- P6. Product quality attributes supported by Six Sigma processes are positively associated with brand performance.

Superior brand performance through quality assurance processes and continuous improvement of products and customer satisfaction in Six Sigma would generate brand loyalty (brand equity) and strong perceived customer value. In this view, brand information may contain strong quality attributes, a targeted message to specific customers, and both verbal and non-verbal associations to enhance memory recall and cognition (Mitchell, 1981). For example, customers' memory recall of a brand is characterized by their ability to attend to, elaborate on and generate cognitive responses to link brand information to the advertisement such as the brand name with product claims (Petty and Cacioppo, 1979; Alba and Hutchinson, 1987). As such, perceived customer value, can be supported by marketing activities, that take advantage of enhanced brand attributes through Six Sigma practices.

- P7.* Brand performance communicated through product attributes and quality standards of Six Sigma is positively associated with perceived customer value.

3. Implications for theory

Six Sigma can be a powerful toolbox and pervasive management philosophy for an organization-wide practice of continuous improvement and service innovations to enhance customer satisfaction and business performance. However, there has been little theoretical analysis and development of underlying Six Sigma theory particularly in relation to its focus on customer satisfaction and continuous improvement. The theoretical propositions (*P1, P2, P3, P4, P5, P6* and *P7*) provide insights into Six Sigma through concepts of organizational innovativeness and market orientation. Six Sigma can make an immediate impact on business operations by reducing the number of defects as well as enhancing customer satisfaction. However, Six Sigma's ability to produce tangible results in the short-term may lead to incremental innovations and/or efficiency savings rather than high levels of innovation for a sustainable competitive advantage. In *P1* and *P2*, theoretical arguments show that while continuous improvement may support innovation, the notion of continually exploiting capabilities and processes is susceptible to incremental innovations. The quality measures of Six Sigma also emphasize current performance and goal orientation. As such, Six Sigma methods that incorporate change and new ideas as well as balance between the combination and trade-off between short- and long-term goals can enhance organizational innovativeness.

Six Sigma embraces behavioral characteristics of market orientation using tools to collect, analyze and disseminate customer and market trends information. Six Sigma addresses the implementation of market orientation by applying and measuring quality standards to satisfy customers better than competitors. In *P3*, Six Sigma can alleviate some of the criticisms about the lack of accountability in marketing by linking customer orientation to Six Sigma methods particularly customer-oriented metrics. However, Six Sigma's approaches to total quality management tend to focus on the organization itself and on adapting the organization to its environment. While this has been useful for controlling standards internally and matching external environmental demands, the analysis can be one-sided as regards the potential to leverage resource capabilities and inter-firm network relationships through relationship management. In *P4*, the focus of resource-based view on resource heterogeneity complements existing Six Sigma tools based on industry structure analysis. *P5* argues that Six Sigma champions (e.g. Master Black belts) can be further utilized to enhance inter-functional coordination spanning organizational boundaries through inter-firm collaboration based on relational norms. As such, theoretical insights from market orientation have the potential to strengthen theory and practice of Six Sigma.

The potential to leverage Six Sigma processes as intangible or non-financial sources of competitive advantage has mostly been implicit. For example, quality standards of Six Sigma may be used to support marketing communications and strategy development. In particular, distinctive product attributes developed through Six Sigma can be communicated and positioned to enhance brand performance (*P6*). Brand information based on distinctive product attributes of Six Sigma practices can be

incorporated in marketing communication messages to influence customer perceptions. The positive outcomes of Six Sigma (e.g. service quality awards) can be exploited to enhance customer value (*P7*). Thus, examining and linking theoretical concepts of Six Sigma with regards to organizational innovativeness and market orientation would further enrich practical and theoretical understanding of Six Sigma.

4. Concluding remarks

Six Sigma has global recognition for changing organizational mindsets and improving business performance particularly in the short-term. As a toolbox and practitioner oriented framework, the underlying theory of Six Sigma has received little research attention. This paper examines two core concepts of organizational innovativeness and market orientation in relation to Six Sigma. While Six Sigma may draw on various management principles, theoretical analysis and development based on core principles of Six Sigma would advance knowledge and understanding of quality management practice. By conceptualizing salient brand attributes as sources that enhance brand performance and perceived customer value, this paper extends Six Sigma processes supported by organizational innovativeness and market orientation to capture tangible and/or observable performance outcomes (see Figure 1). Finally, this paper suggests seven theoretical propositions that can serve as a basis for a systematic investigation and scientific understanding of Six Sigma.

References

- Aaker, D.A. (1991), *Managing Brand Equity: Capitalizing on the Value of Brand Name*, The Free Press, New York, NY.
- Abramowich, E. (2005), *Six Sigma for Growth: Driving Profitable Top-Line Results*, John Wiley & Sons, London.
- Alba, J.W. and Hutchinson, J.W. (1987), "Dimensions of consumer expertise", *Journal of Consumer Research*, Vol. 13 No. 4, March, pp. 411-54.
- Antony, J. and Banuelas, R. (2001), "Six Sigma: a business strategy for manufacturing organizations", *Manufacturing Engineering*, Vol. 8 No. 3, pp. 119-21.
- Antony, J., Antony, F.J., Kumar, M. and Cho, B.R. (2007), "Six Sigma in service organizations: benefits, challenges and difficulties, common myths, empirical observations and success factors", *International Journal of Quality & Reliability Management*, Vol. 24 No. 3, pp. 294-311.
- Atuahene-Gima, K. (1996), "Market orientation and innovation", *Journal of Business Research*, Vol. 35 No. 2, pp. 93-103.
- Auh, S. and Menguc, B. (2005), "Balancing exploration and exploitation: the moderating role of environmental uncertainty", *Journal of Business Research*, Vol. 58 No. 12, December, pp. 1652-61.
- Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.
- Barron, K.E. and Harackiewicz, J.M. (2001), "Achievement goals and optimal motivation: testing multiple goals models", *Journal of Personality and Social Psychology*, Vol. 80 No. 5, pp. 706-22.
- Belohalav, J.A. (1993), "Developing the quality organization", *Quality Progress*, Vol. 26 No. 10, pp. 119-22.

- Creveling, C.M., Hambleton, L. and McCarthy, B. (2006), *Six Sigma for Marketing Processes*, Prentice-Hall, New York, NY.
- de Koning, H. and de Mast, J. (2006), "A rational reconstruction of Six Sigma's breakthrough cookbook", *International Journal of Reliability & Quality Management*, Vol. 23 No. 7, pp. 766-87.
- DeShon, R.P. and Gillespie, J.Z. (2005), "A motivated action theory account of goal orientation", *Journal of Applied Psychology*, Vol. 90 No. 6, pp. 1096-127.
- Dean, J.W. Jr and Bowen, D.E. (1994), "Management theory and total quality: improving research and practice through theory development", *Academy of Management Review*, Vol. 19 No. 3, pp. 392-418.
- Deshpandé, R., Farley, J. and Webster, F. (1993), "Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis", *Journal of Marketing*, Vol. 57 No. 1, pp. 23-57.
- Dierickx, I. and Cool, K. (1989), "Asset stock accumulation and sustainability of competitive advantage", *Strategic Management Journal*, Vol. 35 No. 12, pp. 1504-11.
- Douglas, P.C. and Erwin, J. (2000), "Six Sigma's focus on total customer satisfaction", *The Journal for Quality and Participation*, Vol. 23 No. 2, p. 45.
- Dyer, J.H. and Singh, H. (1998), "The relational view: cooperative strategy and sources of interorganizational competitive advantage", *Academy of Management Review*, Vol. 23 No. 4, pp. 660-79.
- Eng, T.Y. (2006), "An investigation into the mediating role of cross-functional coordination on the linkage between organizational norms and SCM performance", *Industrial Marketing Management*, Vol. 35 No. 6, pp. 762-73.
- Evans, J.R. and Lindsay, W.M. (2005), *The Management and Control of Quality*, 6th ed., South-Western, OH.
- Gray, P. and Meister, D. (2004), "Knowledge sourcing effectiveness", *Management Science*, Vol. 50 No. 6, pp. 621-34.
- Griffin, A. and Hauser, J.R. (1993), "The voice of the customer", *Marketing Science*, Vol. 12 No. 1, pp. 1-27.
- Gutiérrez, L.J.G., Lloréns-Montes, F.J. and Sánchez, O.F.B. (2009), "Six Sigma: from a goal-theoretic perspective to shared vision development", *International Journal of Operations and Production Management*, Vol. 29 No. 2, pp. 151-69.
- Han, J.K., Kim, N. and Srivastava, R.K. (1998), "Market orientation and organizational performance: is innovation a missing link?", *Journal of Marketing*, Vol. 62 No. 4, pp. 30-45.
- Henderson, K. and Evans, J. (2000), "Successful implementation of Six Sigma: benchmarking General Electric Company", *Benchmarking: An International Journal*, Vol. 7 No. 4, pp. 260-81.
- Huber, G.P. (1990), "A theory of the effects of advanced information technologies and organisation design, intelligence, and decision making", *Academy of Management Review*, Vol. 15 No. 1, pp. 47-71.
- Hult, G.T., Hurley, R.F. and Knight, G.A. (2004), "Innovativeness: its antecedents and impact on business performance", *Industrial Marketing Management*, Vol. 33 No. 5, pp. 429-38.
- Hunt, S.D. and Morgan, R.M. (1995), "The comparative advantage theory of competition", *Journal of Marketing*, Vol. 59, April, pp. 1-15.
- Hurley, R.F. and Hult, G.T.M. (1998), "Innovation, market orientation and organizational learning: an integration and empirical examination", *Journal of Marketing*, Vol. 62 No. 4, July, pp. 42-54.

- Jaworski, B. and Kohli, A.K. (1993), "Market orientation: antecedents and consequences", *Journal of Marketing*, Vol. 57 No. 3, July, pp. 53-70.
- Kohli, A. and Jaworski, B.J. (1990), "Market-orientation: the construct, research, propositions, and managerial implications", *Journal of Marketing*, Vol. 54 No. 2, April, pp. 1-18.
- McAdam, R., Davies, J., Keogh, B. and Finnegan, A. (2009), "Customer-orientated Six Sigma call centre performance measurement", *International Journal of Quality & Reliability Management*, Vol. 26 No. 6, pp. 516-45.
- McCarty, T., Daniels, L., Bremer, M. and Gupta, P. (2004), *The Six Sigma Black Belt Handbook*, The McGraw-Hill Companies, New York, NY.
- Maltz, E. and Kohli, A.K. (1996), "Market intelligence dissemination across functional boundaries", *Journal of Marketing Research*, Vol. 33 No. 1, February, pp. 47-61.
- March, J.G. (1991), "Exploration and exploitation in organizational learning", *Organization Science*, Vol. 2 No. 1, pp. 71-87.
- March, J.G. (1996), "Continuity and change in theories of organizational action", *Administrative Science Quarterly*, Vol. 41 No. 2, pp. 278-87.
- March, J.G. (2006), "Rationality, foolishness, and adaptive intelligence", *Strategic Management Journal*, Vol. 27 No. 3, pp. 201-14.
- Mitchell, A.A. (1981), "The dimensions of advertising involvement", *Advances in Consumer Research*, Vol. 8 No. 1, pp. 25-30.
- Morgan, R.M. and Hunt, S.D. (1994), "The commitment-trust theory of relationship marketing", *Journal of Marketing*, Vol. 58 No. 3, pp. 20-38.
- Narver, J.C. and Slater, S.F. (1990), "The effect of market orientation on business profitability", *Journal of Marketing*, Vol. 54 No. 4, October, pp. 20-35.
- Pande, P.S., Neuman, R.P. and Cavanagh, R.R. (2000), *The Six Sigma Way: How GE, Motorola, and Other Top Companies Are Honing Their Performance*, McGraw-Hill, New York, NY.
- Park, S.H. (2003), *Six Sigma for Quality and Productivity Promotion*, Asian Productivity Organization, Tokyo.
- Peteraf, M.A. (1993), "The corner-stone of competitive advantage: a resource-based view", *Strategic Management Journal*, Vol. 14 No. 3, pp. 179-91.
- Petty, R.E. and Cacioppo, J.T. (1979), "Effects of forewarning of persuasive intent and involvement on cognitive responses and persuasion", *Personality and Social Psychology Bulletin*, Vol. 5 No. 2, pp. 173-6.
- Phillips, J.M. and Gully, S.M. (1997), "Role of goal orientation, ability, need for achievement, and locus of control in the self-efficacy and goal-setting process", *Journal of Applied Psychology*, Vol. 82 No. 5, pp. 792-802.
- Porter, M.E. (1980), *Competitive Strategy*, The Free Press, New York, NY.
- Porter, M.E. (1985), *Competitive Advantage*, The Free Press, New York, NY.
- Santos-Vijande, M.L. and González-Alvarez, L.I. (2007), "Innovativeness and organizational innovation in total quality-oriented firms: the moderating role of market turbulence", *Technovation*, Vol. 27 No. 9, pp. 514-32.
- Schroeder, R.G., Linderman, K., Liedtke, C. and Choo, A.S. (2008), "Six Sigma: definition and underlying theory", *Journal of Operations Management*, Vol. 26 No. 4, pp. 536-54.
- Siguaw, J.A. and Diamantopoulos, A. (1995), "Measuring market orientation: some evidence on Narver and Slater's three-component scale", *Journal of Strategic Marketing*, Vol. 3 No. 1, pp. 77-88.

- Slater, S. and Narver, J.C. (1994), "Does competitive environment moderate the market orientation-performance relationship?", *Journal of Marketing*, Vol. 58 No. 1, January, pp. 46-55.
- Smith, D., Blakeslee, J. and Koonce, R. (2002), *Strategic Six Sigma*, Wiley, Hoboken, NJ.
- Song, X.M., Xie, J. and Dyer, B. (2000), "Antecedents and consequences of marketing managers' conflict-handling behaviors", *Journal of Marketing*, Vol. 64 No. 1, pp. 50-66.
- Souder, W.E. (1987), *Managing New Product Innovations*, Lexington Books, Lexington, MA.
- Wernerfelt, B. (1984), "A resource-based view of the firm", *Strategic Management Journal*, Vol. 5 No. 2, pp. 171-80.
- Zhou, K.Z., Yim, C.K. and Tse, D.K. (2005), "The effects of strategic orientations on technology- and market-based breakthrough innovations", *Journal of Marketing*, Vol. 69 No. 2, April, pp. 42-69.

Further reading

- Brown, S.W. (2005), "When executives speak, we should listen and act differently", *Journal of Marketing*, Vol. 69, October, pp. 1-25.

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